PROJECT NUMBER: 1702
PROJECT TITLE: Optical Processing and Aerosol Research
PROJECT LEADER: K. A. Cox
PERIOD COVERED: November, 1989

I. PACK INSPECTION SYSTEM

A. **Objective**: Develop and implement a method for the on-line inspection of cigarette packs.

B. **Results**: The reset circuit required for the laboratory pack inspection system has been completely debugged. The reset circuit provides the synchronizing signals for both the imaging camera and the Androx imaging board.

The laboratory pack inspection system was transferred to Edwards Machine Co. in Ashland, Va., for testing on a vacuum conveyor designed by PM Engineering. The primary objectives of the test were to verify the reliability of the image acquisition components and to verify that the decision to reject a pack could be reached before the pack passed the reject station. Images of a large number of Parliament packs were also acquired for further testing of the discrimination capability of the system.

Software development for the laboratory pack inspection system has continued. The software has been developed to allow extensive flexibility in the choice of inspection options and to enable the calculation of the statistics needed to quantify the performance of the system in the upcoming factory trial.

In collaboration with Development Engineering, the hardware specifications are being developed for a factory prototype inspection system. Unlike the current laboratory inspection system, the factory prototype will be suitable for long-term installation in a factory environment and will have the capability for inspecting three views at the rate of 15 units per second. Several vendors have been identified with the capability for providing the image acquisition and analysis hardware needed for the factory prototype. Discussions with each of these vendors are ongoing.

The pack inspection system carries out its inspection on binary images obtained by thresholding gray scale images. A method for automatically determining the optimum threshold continues to be an area of active research. Simulations have shown that a correlation criteria for threshold selection works well for direct images but does not work well for edge detected images. Current research is directed toward generalizing the correlation criteria so that it works equally well in both cases.

C. **Plans**: Carry out a factory trial of the PM pack inspection at Stockton Street. Complete the hardware specifications for the factory prototype.

2022192889

Source: https://www.industrydocuments.ucsf.edu/docs/znjm0000

II. INDIVIDUAL CIGARETTE INSPECTION

A. **Objective**: Develop a method for high resolution, on-line inspection of individual cigarettes.

B. **Results**: Optical hardware for the fully focused acoustooptic (AO) scanner was set up and tested. The AO cell was used in a negative focal length mode. A spot of about 0.4 mm diameter was obtained with a scan rate exceeding 100,000 scan/second. Additional work is now in progress to provide a full cigarette length scan with better control of the distance between the cigarette and the scanner.

III. AEROSOL GENERATION AND MEASUREMENT

A. **Objective**: Develop and characterize a laboratory aerosol generator capable of producing highly concentrated aerosols.

B. **Results**: A method has been devised to measure the aerosol concentration exiting the generator using an absolute filter and a 500 ml syringe. Filter weights have been found to be stable even when loaded with glycerin. The method has been used to quantify the losses in the generator due to vapor condensation on the walls of the cooling section. Vapor losses of approximately 50% have been observed.

A commercial ultrasonic aerosol generator has been evaluated. The generator is capable of producing a dense water aerosol but is ineffective in producing an aerosol from pure glycerin. A solution of 30% glycerin in water was successfully nebulized.

2022192890

Source: https://www.industrydocuments.ucsf.edu/docs/znjm0000